



Armed Forces College of Medicine AFCM



General Plan of GIT and Histological Structure of Esophagus

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INTENDED LEARNING OBJECTIVES (ILOs)



By the end of this lecture the student will be able to:

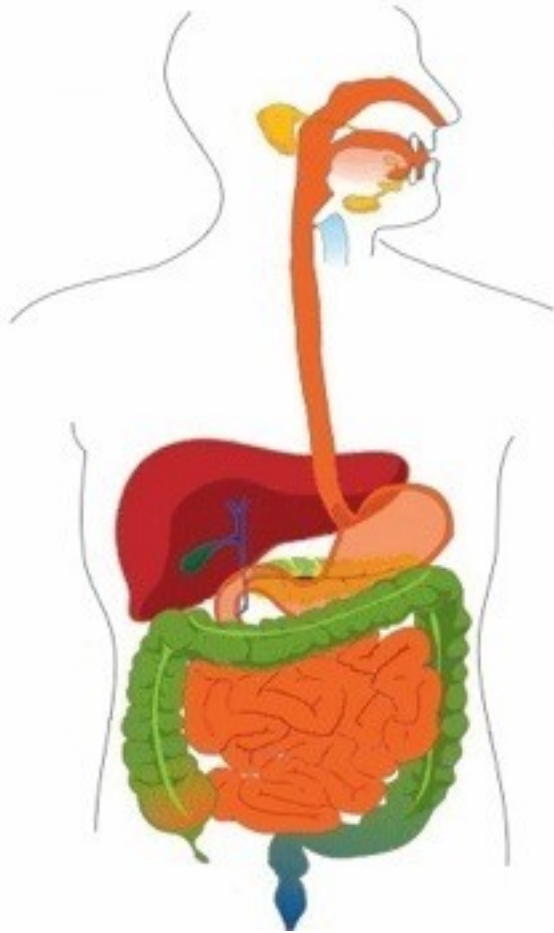
- Describe the general histological structure of the gastrointestinal tract.
- Describe the histological structure of the esophagus.
- Correlate the histological structure of the esophagus to its function.
- Interpret the altered microscopic structure of the esophagus in different diseases.

Key points of this lecture

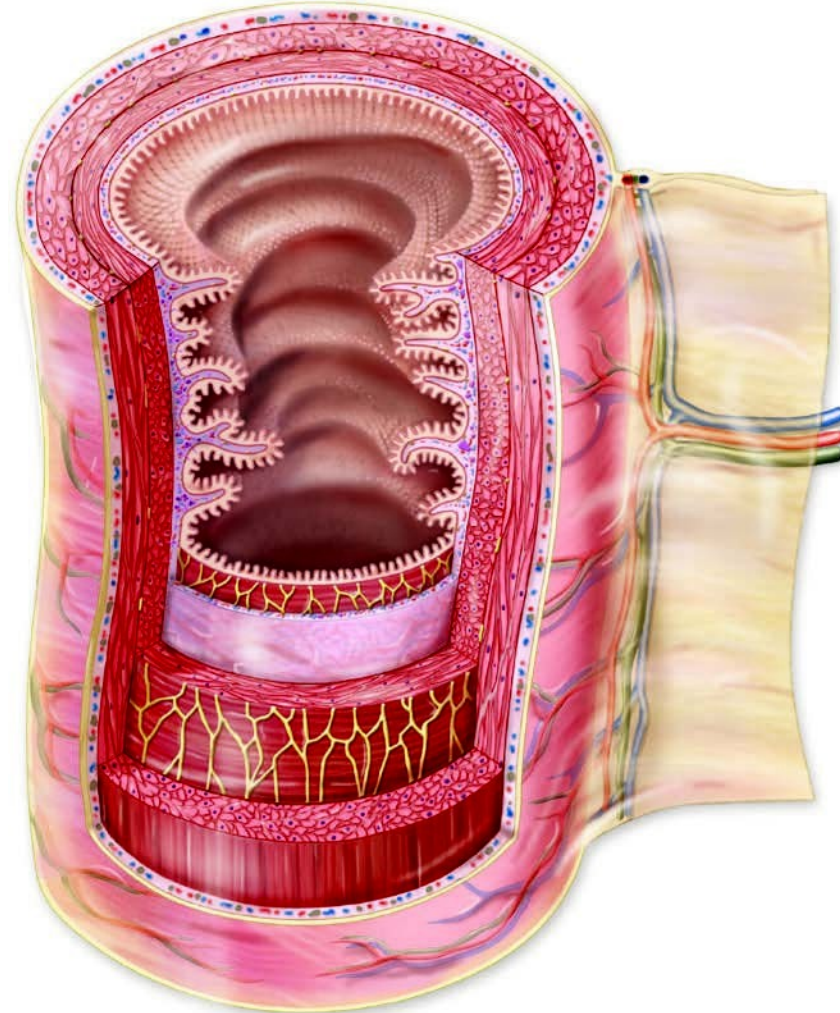


1. General structure of the 4 layers of GIT tube; mucosa, submucosa, muscularis and adventitia.
2. Site and importance of the enteric nervous system of the GIT.
3. Specific LM picture of the esophagus.
4. Altered esophageal structure in case of reflux esophagitis and Barrett esophagus.

General Plan of the GIT



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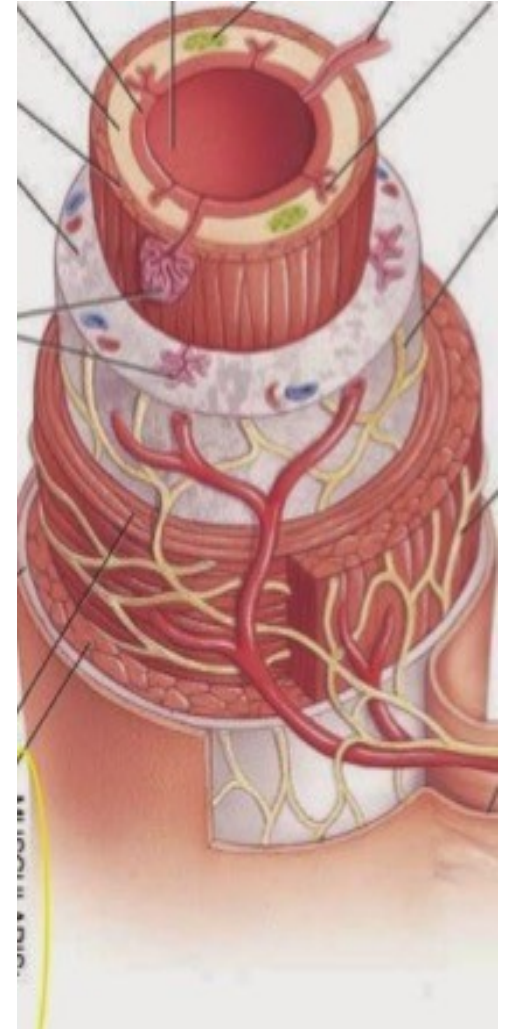
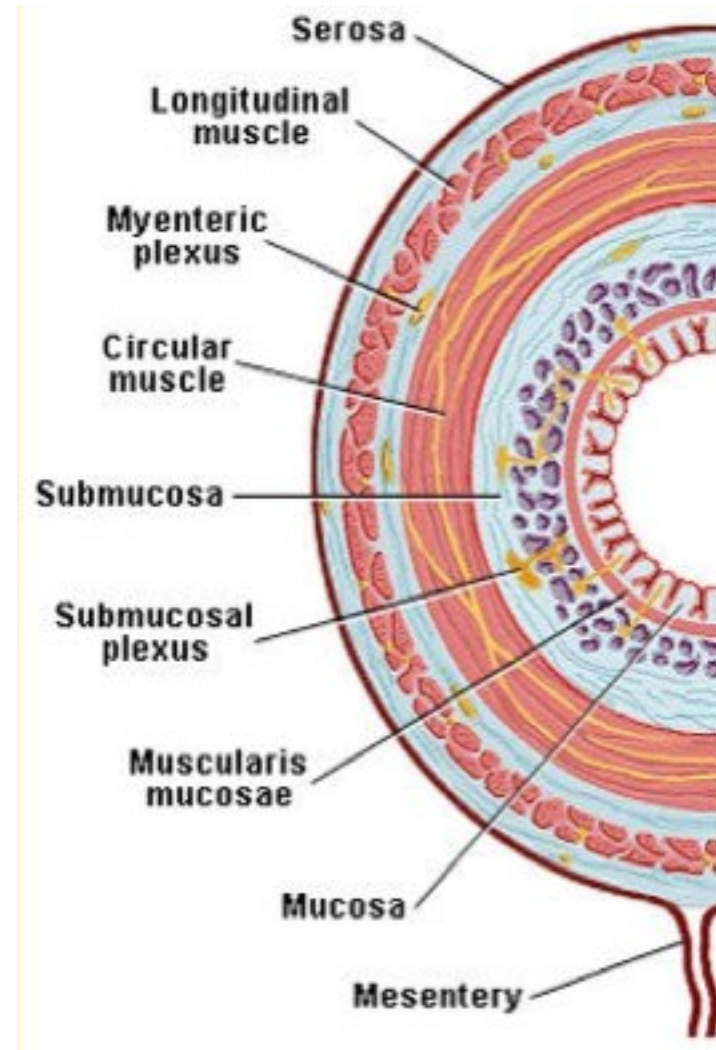
Junqueira's basic histology

General Plan of the GIT



4 layers:

- a. Mucosa:** - Epithelial lining
- Lamina propria
- Muscularis mucosa.
- b. Submucosa:** C.T.
- c. Muscularis externa.**
- d. Serosa or adventitia**



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General Plan of the GIT



I- Mucosa (mucous membrane)

- 1- Epithelium**
- Esophagus & anus: St. sq.
 - non K. Ep.
 - Stomach & Intestine: Simple columnar

2- Lamina propria

Loose connective tissue +
lymphatic tissue (**G**ALT) + **G**lands.

3- Muscularis mucosa

Smooth muscle arranged in 2
layers:

Inner circular & outer

longitudinal.... Folding of mucosa



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II- Submucosa:

Connective tissue containing :

- Large blood vessels, lymphatics
- **M**eissner's plexus of nerves.
- **G**lands in esophagus, duodenum

III- Muscularis externa:

- **S**mooth muscles arranged in 2 or more layers:
 - **I**nnner circular layer, mix the lumen content (by constricting the lumen).
 - **O**uter longitudinal layer, propels food (by shortening the tube).
- **A**uerbach's nerve plexus (**myenteric plexus**) between both layers.



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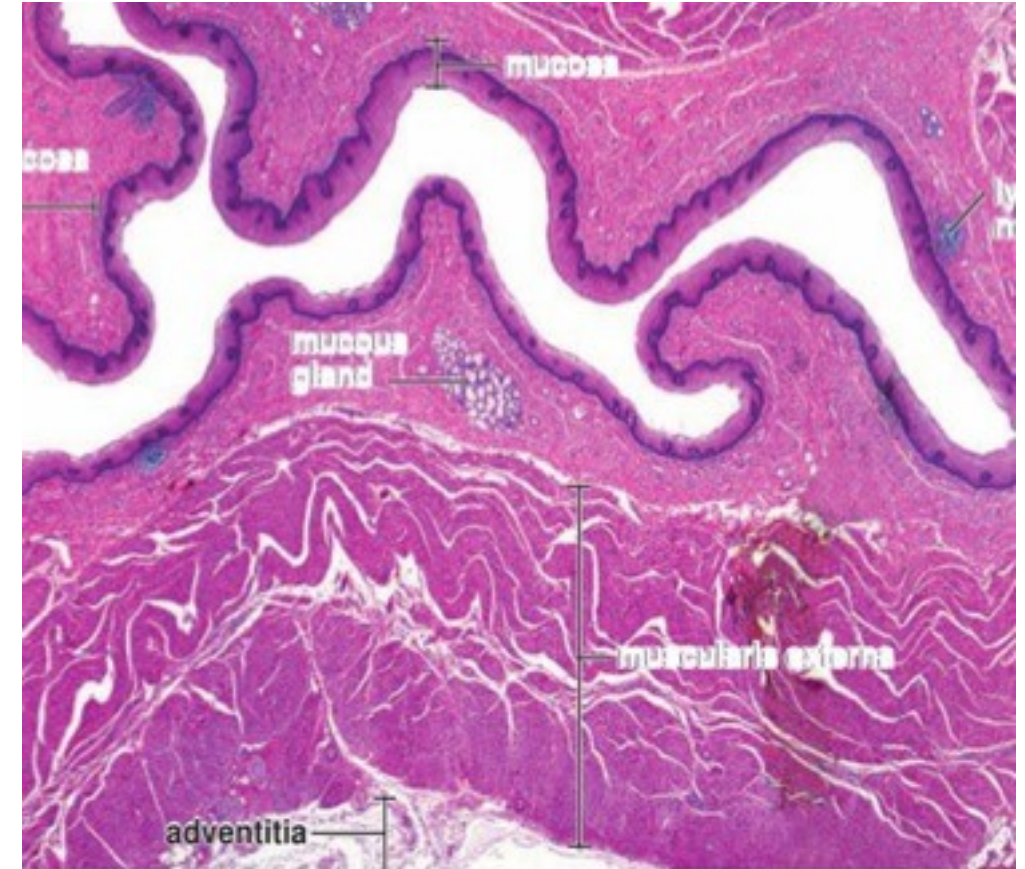
Meissner's and myenteric plexuses constitute the enteric nervous system.



IV- Adventitia or Serosa

Adventitia: C.T. layer (Fix to surrounding).

Serosa: loose C.T. covered by peritoneum (mesothelium) (gives a smooth surface).



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Which of the following is true about the muscularis externa of GIT?

- a) Has 2 layers of skeletal muscle fibers.
- b) Contains Meissner's plexus of nerves.
- c) Responsible for peristalsis of the tube.
- d) Consists mainly of longitudinal muscle fibers.
- e) Helps in secretion of mucosal glands of the GIT.



Which of the following applies to Meissner's plexus of nerves?

- a) Absent in the small intestine
- b) Contains only sympathetic nerve plexus.
- c) Regulates peristaltic contractions of the GIT.
- d) Controls secretory activity of submucosal glands.
- e) Located between the muscle layers of muscularis externa.

Structure of Esophagus



I- Mucosa

- **Epithelium:** st.sq.non kerat.

Lamina propria: CT containing small **GALT** + mucous secreting **g**lands:

- In Upper part : to lubricate & protect the mucosa.
- In lower part: **cardiac gland** to protect from backflow of

3- Muscularis mucosa

IC, OL **smooth** muscle layers.

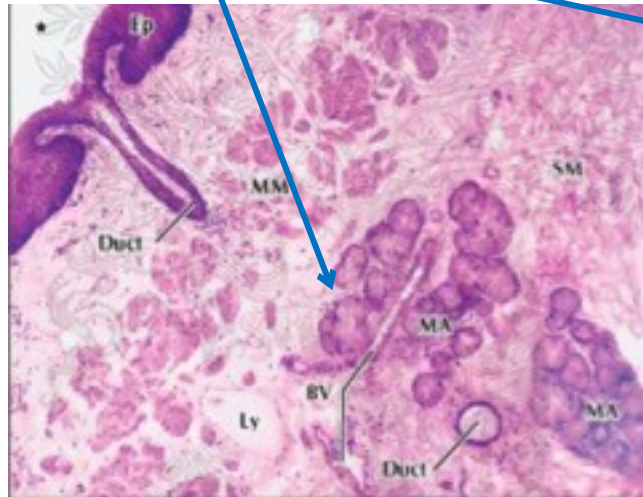


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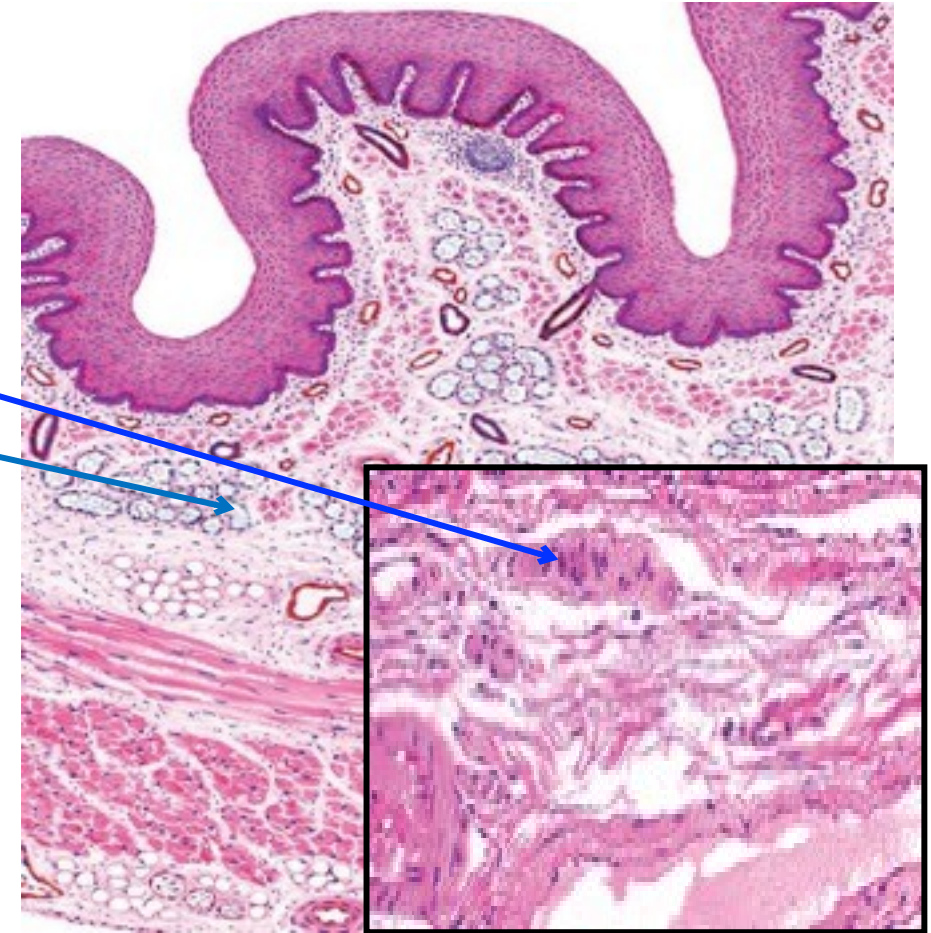
II- Submucosa

- C.T. containing:

- **M**eissner's nerve plexus.
- Esophageal mucous **g**lands.



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Muscularis externa: For **peristaltic** movements

- Arranged in Inner circular (IC), Outer

Types:

- **Upper third** □ skeletal muscle fibers.
- **Middle third** □ mixture of smooth & skeletal muscle fibers.
- **Lower third** □ smooth muscle fibers

Myenteric nerve plexus (Auerbach's):

- Between the 2 layers of the muscularis externa.





4- Serosa or adventitia:

- Esophagus is covered by **adventitia**.
- Below the diaphragm, esophagus is covered with **serosa**.

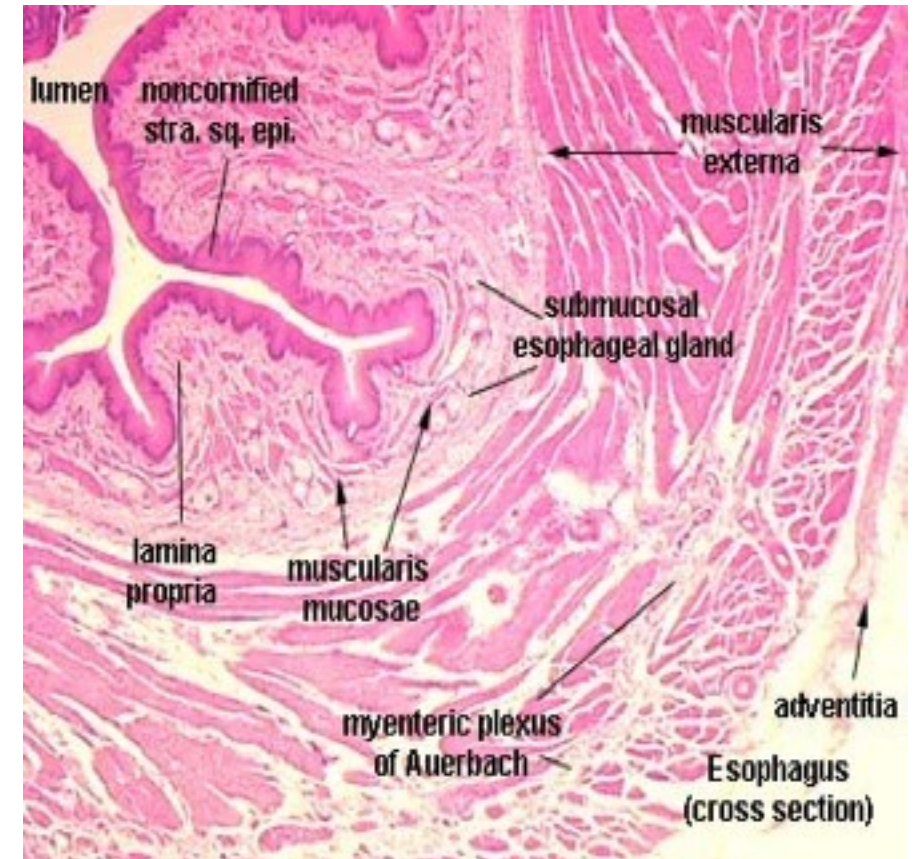


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Which of the following characterizes the mucosa of the esophagus?

- a) Unidentifiable muscularis mucosa.
- b) Contains Meissner's plexus of nerves.
- c) Lined by stratified cuboidal epithelium.
- d) Contains serous acini in the lower part.
- e) Mucous glands in its upper and lower parts.

Clinical application **Reflux esophagitis**



The lubricating mucus produced in the esophageal submucosal glands offers little protection against acid that may come from the stomach.

So, if there is incompetent  lower esophageal sphincter

Movement of acids & pepsin from the stomach to the  esophagus

heartburn or reflux esophagitis.



Chronic heartburn



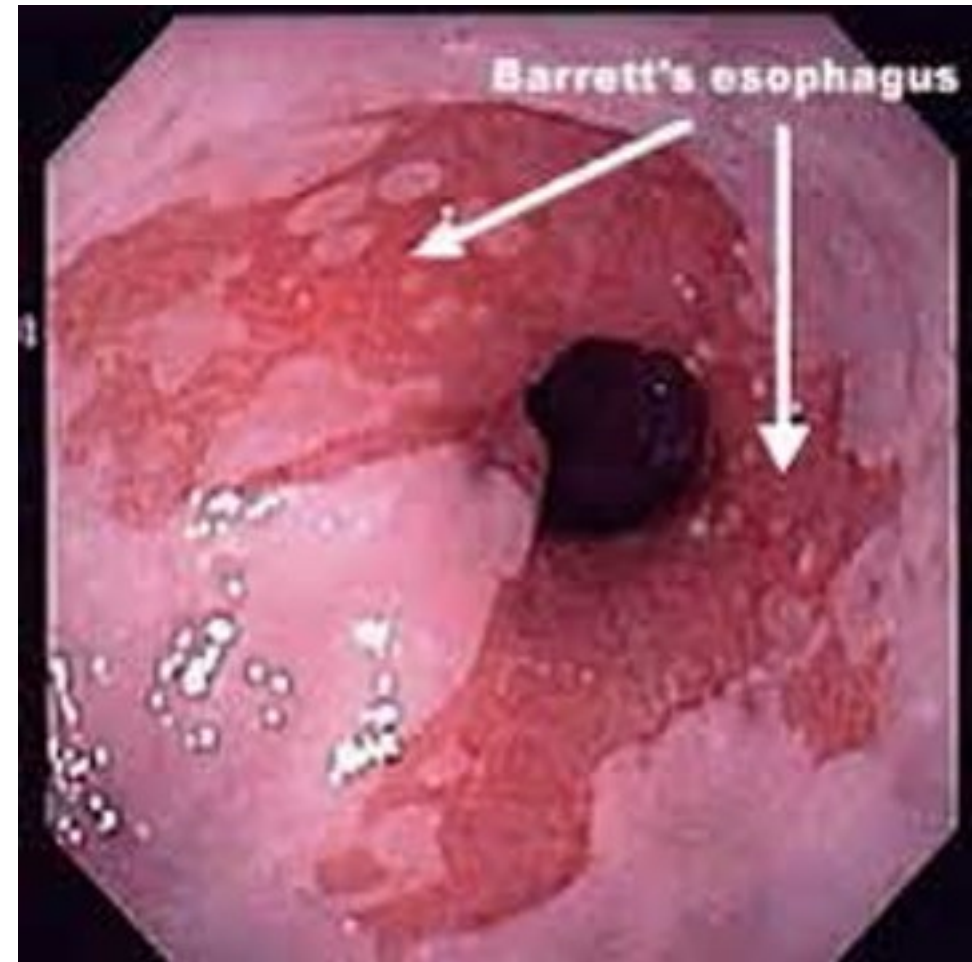
Erosion of the esophageal mucosa
gastroesophageal reflux disease (GERD).



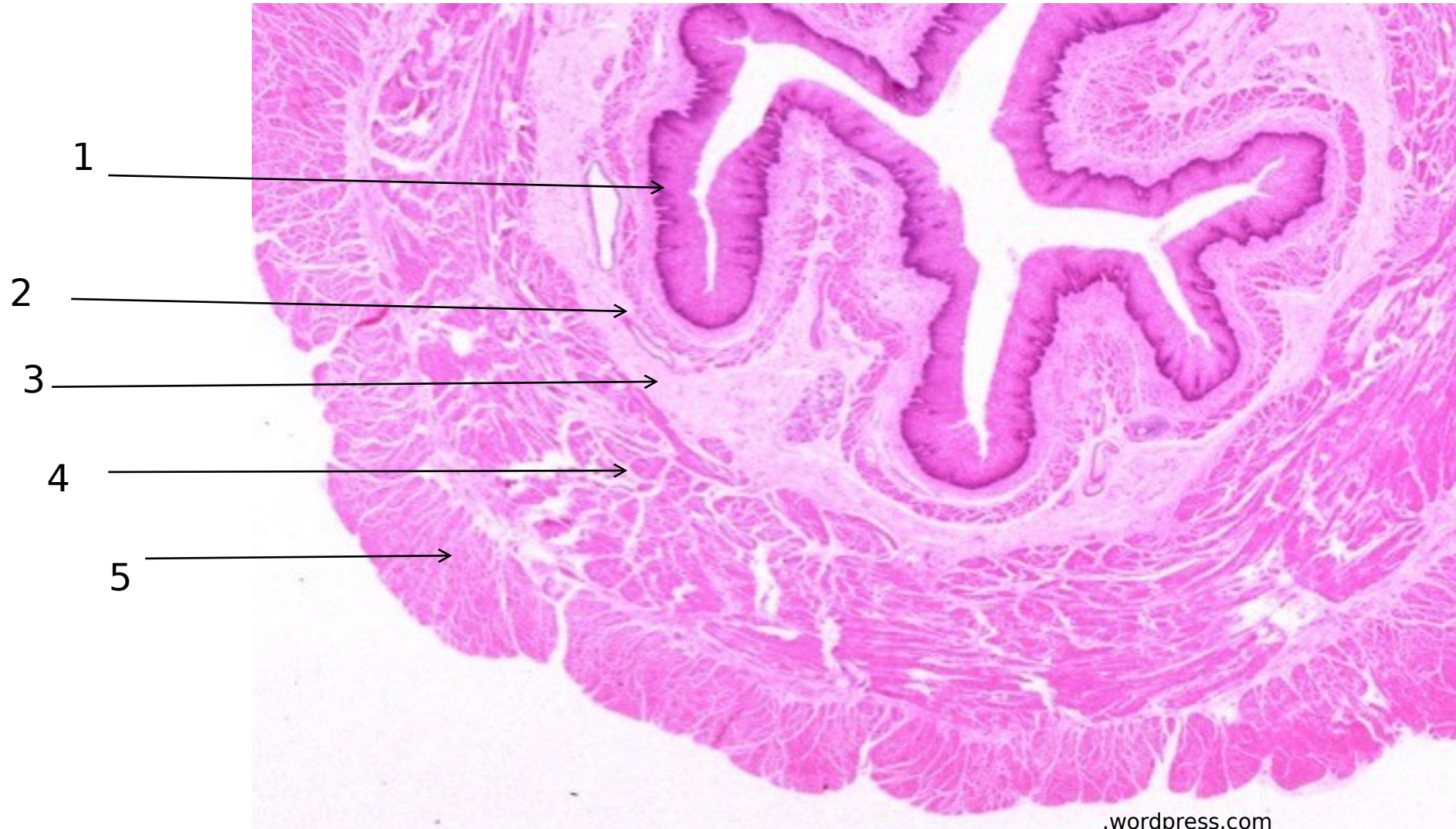
Untreated GERD

Metaplasia of epithelium (**salmon pink areas** in esophagus)

(d.t. change of stratified squamous to simple columnar with goblet)



Lecture Quiz



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Lecture quiz



A 50 years old man presented to the clinic with an epigastric pain after meals. The history revealed taking proton pump inhibitor drugs for several days to treat his chronic heartburn. The endoscopic examination revealed the presence of salmon pink areas. How would the esophageal epithelium attribute to this color?

- a) Normal simple cubical epithelium.
- b) Change of st. sq to simple columnar.
- c) Normal stratified squamous epithelium.
- d) Change of st. columnar to simple columnar.
- e) Change to pseudostratified columnar epithelium.

Remember the Key Points of this Lecture



1. Structure of the 4 layers of GIT tube.
2. Site and importance of the enteric nervous system of the GIT.
3. Specific LM picture of the esophagus.
4. Altered esophageal structure in case of reflux esophagitis and Barret esophagus.

Summary



From the esophagus to the rectum, the digestive tract has **four major layers**: a lining **mucosa**, a **submucosa**, a **muscularis**, and an outermost **adventitia** or mesothelium-covered **serosa**.

The **mucosa** varies regionally along the tract but always consists of a lining **epithelium** on a **lamina propria** of loose connective tissue and smooth muscle fibers extending from **muscularis mucosae** layer.

Summary



The mucosa of the **esophagus** has **nonkeratinized stratified squamous epithelium**; its muscularis is striated at its superior end with smooth muscle at its inferior end, with mixed fiber types in the middle.

Most of the outer layer of the esophagus is **adventitia**, merging with other tissues of the mediastinum.

At the **esophagogastric junction**, stratified squamous epithelium changes abruptly to **simple columnar epithelium** invaginating into the lamina propria as many branched tubular gland

SUGGESTED TEXTBOOKS



1. Junqueira`s Basic Histology; Text and Atlas. 13th edition 2016, pp: 305-307.
2. Histology atlas and test: Michael H. Ross and Wojciech Pawlina, 7th edition, 2015, pp: 568-572.



**Thank
You**

Mahalo

Kiitos

Tack

Grazie

Toda

Obrigado

Takk

Thanks

Gracias

Merci